

UNITED STATES DISTRICT COURT
FOR THE WESTERN DISTRICT OF WASHINGTON
AT SEATTLE

HO TRAN,

Plaintiff,

v.

ARCTIC STORM MANAGEMENT GROUP,
LLC; ARCTIC FJORD, INC., *in personam*;
and F/V ARCTIC FJORD, her engines, tackle,
gear and appurtenances, *in rem*,,

Defendants.

IN ADMIRALTY

No. CV6-1275 RSM

DECLARATION OF STEVEN WIKER IN
OPPOSITION TO DEFENDANTS' MOTION
FOR SUMMARY JUDGMENT

I, Steven F. Wiker, Ph.D., CPE declare as follows:

1. I am a faculty member with the Department of Industrial and Management Systems Engineering, College of Engineering and Mineral Resources, at West Virginia University, Director for the NIOSH Safety Engineering and Ergonomics Program, and I direct the Ergonomics Laboratory. My teaching and research responsibilities fall into the fields of ergonomics/human factors engineering and safety engineering. I teach courses that address safety engineering and use of OSHA standards in all working environments. I have attached my current curriculum vitae which outlines my academic training in the fields of human anatomy and physiology, engineering and safety.

2. I am a retired Coast Guard officer who was trained to operate ships as a deck officer. That training included vessel dynamics, crew protection when operating under various sea states,

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DECLARATION OF WIKER IN OPPOSITION TO
DEFENDANTS' MOTION FOR SUMMARY JUDGMENT- 1
[USDC WD WA NO. CV6-1275 RSM]

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1 vessel buoyancy and righting, oceanography, design characteristics of ships that present hazards
2 when underway or in port, etc. I have operated medium endurance cutters, patrol boats and
3 motor life boats in sea states ranging from calm to seas that approached 30 feet.

4 **3.** I served in a Naval Engineering billet within the Office of Research and Development,
5 United States Coast Guard, Washington, DC where I was responsible for enhancing vessel safety
6 and crew function. I was specifically responsible for measurement of ship motion and its affects
7 upon Coast Guard and Navy crews. I wrote my Masters Thesis on the effects of vessel motion
8 upon human performance and physiology.

9 **4.** I was a Commanding Officer of Coast Guard vessel inspection and port safety units at
10 Duluth, MN and Detroit, MI, and served as Executive, Operations and Training Officers at other
11 vessel augmentation and inspection and port safety units at Honolulu, Milwaukee, Toledo, and
12 Duluth. Those inspections addressed vessel structural integrity, design features that affected
13 crew safety and health, and other factors that affected vessel operation and public safety.

14 **5.** I am well aware of the memorandum of agreement between OSHA and the U.S. Coast
15 Guard. The objective of the agreement was to share responsibility for vessel compliance with
16 safety and health standards that spanned OSHA and Coast Guard safety and health regulations.
17 This agreement was made to increase efficiency and avoid confusion about jurisdictional
18 responsibility for inspection and enforcement of OSHA and Coast Guard regulations. The
19 agreement aims to provide a safe and healthful workplace for vessel crews, passengers and
20 contractors aboard vessels. At a minimum, the memorandum of agreement provides
21 acknowledgment of the applicability of OSHA standards aboard marine vehicles such as that
22 involved in Mr. Tran's accident and injury.

23 **6.** I have been awarded competitive research grant and contract awards for research and
24 applied engineering design of Coast Guard and Navy vessels while serving as an engineering
25 faculty member. The objectives of those research projects were to enhance crew safety and

1 performance and compliance with a general duty to provide safe and healthful working
2 conditions for crews and passengers when performing normal and extreme operational duties
3 under a variety of sea states.

4 7. I have reviewed the following documents and materials and used them in the formulation
5 of my opinions in addition to my direct inspection of the workstation aboard the M/V Artic Fjord
6 and interview of Mr. Tran on June 14, 2007:

- 7 • Discovery Responses
- 8 • Defendant's Initial Disclosures
- 9 • Defendant's Initial Responses to Plaintiffs' Initial Interrogatories and Requests for
10 Production
- 11 • Documents bates numbered Def00139 to Def00462
- 12 • Deposition Transcripts
 - 13 ○ Craig Anderson
 - 14 ○ Romeo Rafanan
 - 15 ○ Ho Tran
- 16 • Photographs
 - 17 ○ Photographs taken by Troy Locati on 11/30/06
 - 18 ○ Photographs taken by OnPoint on 11/30/06
 - 19 ○ Videotape filmed by Onpoint on 11/30/06

20 8. Following my inspection, I found that Mr. Tran's workstation was not safe, it was not
21 free from recognized fall hazards, the nature of the fall and injury experienced by Mr. Tran could
22 be expected given the lack of guard rail to the side of the work platform, and the workstation
23 design and layout contributed to his fall and subsequent injuries. Photos illustrating the hazards
24 are attached.

1 **9.** The vessel owners and operators recognized the fall hazards imposed by the design of
2 the work platform used by Mr. Tran and provided a guardrail on the platform to the rear of the
3 workers to guard against fall off of the platform onto surrounding equipment and structures that
4 would cause bodily injury. The same hazards existed to the side of the workers; yet no guardrail
5 was provided. This is a violation of the General Duty Clause and of specific walkway and fall-
6 prevent federal regulations.

7 **10.** Section 5(a)(1) of the Occupational Safety and Health Act requires:

8 “Each employer shall furnish to each of his employees employment and a
9 place of employment which are free from recognized hazards that are
 causing or are likely to cause death or serious physical harm to his
 employees.”

10 This general duty is shared across safety and health and employment-related standards such as
11 the Jones Act duty to provide a safe place in which to work, and the seaworthiness doctrine
12 which requires that vessels must be reasonably fit for their intended service. The Human Factors
13 Engineering ASTM Standard for Design of Marine Vehicles also addresses the need to provide
14 passive fall protection on platforms in which workers can fall onto machines or structures that
15 can cause bodily injury.

16 **11.** All standards provide general or goal-based language that requires engineers and
17 other responsible parties to comply with the intent of the standard. This is done to prevent one
18 from claiming that no specific instructions or design specifications were found in the standard
19 that addressed a particular hazard. From an engineering perspective, it is not feasible to write
20 standards that specifically address every design aspect and interplay of design features in a wide
21 array of operational environments. Moreover, panels that develop standards, which I have had
22 membership on, do not want to impose a specific design that could be suboptimal for particular
23 design, task, environment and other situational factors. Instead, engineers and designers are free
24 to develop designs that meet or exceed the intent of the standard. This is the basis for General

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1 Duty Clauses and like language in standards, and use of performance in lieu of specification-
2 based standards.

3 **12.** I have read Mr. Gleason's report of findings. He is correct that if a platform is 4 feet
4 or greater, guard rails must be installed; however, that does not mean that guardrails should not
5 be installed. His statement that OSHA requires guard rails only for the aforementioned condition
6 is incorrect. Guardrails are required when workers can fall off of a platform into or onto
7 dangerous equipment, for ramps where workers can accidentally step off of a discontinuity, or
8 when guard or hand rails are needed to provide postural stability assistance. Mr. Tran's platform
9 did present risk of falling onto adjacent machines, hard pointed edges, and other adjacent
10 apparatus. While Mr. Gleason did not recognize that hazard, the employer did. The employer
11 provided the guard rail to protect the worker from injury from falling backwards. Unfortunately,
12 the same protection was not provided to the side of the worker. Mr. Gleason made no mention of
13 the existing guarding system and the basis for its existence.

14 **13.** Vessels lurch unexpected at sea because sea states are not comprised of a single
15 wave set. Waves on ocean surfaces come from a variety of different directions (e.g., primary,
16 secondary, etc. swells) and create superposition waves that cannot be easily predicted by deck
17 officers who can view the wave behaviors from the bridge. Workers below decks have no visual
18 cues of wave sets approaching the vessel. Moreover, changes in vessel course or minor
19 movements in a ship's rudder, in combination with swell encounters, can produce unexpected
20 movements that workers above and below decks cannot predict. Vessels provide hand rails and
21 other passive fall protection or recovery systems to protect crewmembers.

22 **14.** All experienced mariners are aware of the quote, "one hand for the vessel, and one
23 hand for one's self." This quote is based upon centuries of experience with vessel behaviors at
24 sea where if both hands are performing work vessel motions can induce falls. I have measured
vessel behavior in sea states 0 to 5 and experienced crew and test subject loss of postural stability

1 when vessels lurched unexpectedly even when steaming specified courses with no course
2 change. Mr. Tran's job required that he use both hands at the same time.

3 **15.** Humans maintain balance when postures are disturbed by reflexive action. The
4 extensor reflex causes the arms and legs to extend to increase the base of support to prevent the
5 body's center of mass from exceeding the stance envelope. Workers in Mr. Tran's work
6 platform could be expected to experience unexpected movement of the platform in all six
7 degrees of freedom (including rolls to the side). When that happens, if guard rails are not in
8 place, the foot can move outboard and step into air; producing a fall. Given that a fall would
9 occur onto machinery components and platform/step edges, risk of fall and head injury hazard is
10 clearly present.

11 **16.** The vessel had already implemented a partial guarding system; it was simply
12 incomplete when the rail was not extended to the side of the platform. Adding a guardrail to side
13 could have been easy accomplished. Workers remain on the platform for many hours and
14 movement off the platform is not an issue in placing a locking-hinged guard rail.

15 **17.** Mr. Gleason concluded that Mr. Tran was personally responsible for the fall accident
16 and injury because he turned too quickly to his right to try to determine the basis for change in
17 the acoustic nature of the fish processing machine. Simply turning at any velocity would not
18 cause a fall if the center of mass remains within the stance envelop. Only inertial action of the
19 center of mass of the body during that turn, due to vessel accelerations, could cause the fall. Mr.
20 Gleason's conclusion is without any physical basis or justification.

21 **18.** Even if one accepts Mr. Gleason's unfounded conclusion, worker torso twisting or
22 turning behavior should have been expected in the normal course of his duties. Fall prevention
23 countermeasures should have been in place to address Mr. Gleason's expectation of a worker
24 fall. Workers cannot be expected to accurately assess vessel movement below decks when
25 focused upon their tasks, and they cannot overcome neuropsychological reflexes that would

1 produce falls given the design of the platform and surrounding apparatus. This is clearly a case
2 where one must passively protect a worker.

3 **19.** Mr. Tran did not perform any unsafe act. He performed his job as instructed. Vessel
4 movements should be expected by the vessel owners. The guarding and fall protection system
5 provided to his rear demonstrates a recognition of the fall hazard. The vessel did not provide the
6 same protection to the side of Mr. Tran's work platform. Unexpected vessel movement, a
7 normal situation, could cause Mr. Tran to fall as described in the documents reviewed and his
8 limited recall of the fall kinematics. Individuals who fall often cannot report specific fall
9 mechanics.

10 **20.** Mr. Tran's workstation was unsafe. It exposed him to recognized hazards that could
11 and did produce his injurious fall. Only automobile accidents kill and injure more workers than
12 falls. The basis for falls and fall prevention are well understood by the engineering and safety
13 community. Standards address this problem. The vessel recognized the hazard and provided
14 some but not complete protection. The hazard was substantial in nature and risk of fall was
15 material. Thus, the workstation provided to Mr. Tran was unreasonably hazardous for its
16 intended activities. It was an unsafe place in which to work and constituted an unseaworthy
17 condition. The configuration of the workstation was a significant cause of Mr. Tran's injuries.

18 I declare under penalty of perjury that the foregoing is true and correct.

19 Dated this 16 day of August, 2007, at Morgantown, West Virginia.

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21
22 Steven F. Wiker, Ph.D., CPE

Steven F. Wiker, Ph.D., CPE

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Professional Interests

Dr. Wiker conducts basic and applied research, consults and teaches in the fields of ergonomics/human factors, occupational biomechanics and safety engineering. The objectives of the research are to improve worker health, safety, and performance by improving working environment, equipment, and job design. His efforts have focused upon the identification and control of performance, safety and health problems that arise from biomechanical, physiological, or perceptual-cognition-motor problems that are encountered in the industrial workplace, aboard aerospace and marine vehicles, or when using products. Efforts are often incorporated into: a) design guidelines, specifications or standards, b) computer-models for hazard identification and implementation of administrative or engineering controls of biomechanical, physiological, and perceptual-motor related performance, health, and safety problems, or c) improved design and usability of equipment or products.

Education

Year	Degree	Institution
1986	Ph.D. Industrial & Operations Engineering	University of Michigan, Ann Arbor
1982	M.S. Industrial & Operations Engineering	University of Michigan, Ann Arbor
1981	M.S. Biological Sciences (physiology)	George Washington University
1975	B.S. Physiology	University of California, Davis

Honors and Awards

1. Achievement Medal, United States Coast Guard, 1988, 1992
2. Alpha Pi Mu, Industrial Engineering Honor Society
3. Center for Robotics and Integrated Manufacturing Fellowship 1981-1982
4. Chair, Industrial Ergonomics Technical Group, Human Factors and Ergonomics Society, 1995-1996
5. Ford Motor Company Fellowship 1983-1985
6. Humanitarian Service Medal, United States Coast Guard, 1993
7. International Chair, International Conference on Environmental Systems 1997
8. International Vice Chair, International Conference on Environmental Systems 1996
9. Men of Achievement 1986 to Aug-07
10. National Institutes of Occupational Health & Safety Traineeship 1979-1984
11. Outstanding Oral Technical Presentation Award, 1997 Society of Automotive Engineers Conference of Aerospace Manufacturing Technology
12. Senior Member, Institute of Industrial Engineers
13. Sigma Xi, Life Member
14. Technical Chair, American Institutes for Astronautics and Aeronautics, 1994-1995
15. Tau Beta Pi, Engineering Honor Society
16. United States Coast Guard, Unit Commendation Medal 1990
17. United States Coast Guard, Letter of Commendation, 1979
18. West Virginia University Faculty of the Month 2006, Campus Pan-Hellenic Society
19. Who's Who: Science & Engineering, Professional Safety, American Education, West, Mid-West, Emerging Leaders in America, and in the World

Professional Experience

Associate Professor and Director, Ergonomics & Safety Engineering Program and Ergonomics Laboratory

**Industrial and Systems Engineering, College of Engineering & Mining Resources,
West Virginia University, Morgantown, West Virginia (2003 - Present)**

Directs academic and research program in ergonomics and safety engineering, and the Ergonomics Laboratory. Teaches undergraduate, graduate and continuing education courses in industrial ergonomics, advanced human factors engineering, safety engineering and accident reconstruction; supervise graduate students, and directed, supervised, and funded research projects in ergonomics and safety engineering.

Visiting Professor

**Industrial and Systems Engineering, College of Engineering & Mining Resources,
West Virginia University, Morgantown, West Virginia (2000 - 2003)**

Teach undergraduate, graduate and continuing education courses in industrial ergonomics, advanced human factors engineering, safety engineering and accident reconstruction; supervise graduate students, and directed, supervised, and funded research projects in ergonomics and safety engineering.

Director

**Ergonomic Design Institute,
Bellevue, Washington (1997-2000)**

Served as the Director and Chief Executive Officer with associated responsibilities. Administered and directed research and development, educational and consultation programs, and manages associated senior staff. Specific activities included representing the Institute, development of strategic development and research plans, financial operational planning, development or oversight of research and development programs, proposals and budgeting, and development of joint university, industrial and public sector teams. Served as the Head of ergonomics and safety engineering technical divisions.

Adjunct Associate Professor

**Industrial Engineering, College of Engineering,
University of Washington, Seattle, Washington (1997 - 2000)**

Teach undergraduate, graduate and continuing education courses in industrial ergonomics, advanced human factors engineering, safety engineering and accident reconstruction; supervise graduate students, and directed, supervised, and funded research projects in ergonomics and safety engineering.

Associate Professor

**Department of Environmental Health, School of Public Health and Community Medicine,
University of Washington, Seattle, Washington (1993 - 1997)**

Developed and taught graduate and continuing education courses in industrial ergonomics, advanced human factors engineering, and safety engineering; supervised graduate students, and directed, supervised, and funded the Ergonomics Laboratory. Served as Director, Occupational Safety Program, Northwest Center for Occupational Safety and Health.

Assistant Professor (1988-1994)

**Department of Industrial Engineering
University of Wisconsin, Madison, WI 53706**

Developed and taught undergraduate and graduate courses in human factors engineering and industrial ergonomics, advising undergraduate and graduate students, directing, supervising, and funding the human performance and ergonomics research laboratory.

Director, Telerobotics Laboratory (1991-1994)

**Wisconsin Center for Space Automation & Robotics,
University of Wisconsin, Madison, WI 53706**

Administration of the laboratory, engineering and scientific support staff, and research assistants; formulation and construction of research and development proposals; pursuit of funding from government and industrial sources; management and conduct of experimental research; publication of research findings, industrial consultation; development of joint university and industrial space commercialization projects; and development and supervision of space flight experiments.

**Head, Teleoperator Ergonomics Laboratory (1986-1988)
Naval Ocean Systems Center, San Diego, California**

Established and served as a principal investigator in the Teleoperator Ergonomics Laboratory, NOSC, San Diego. Supervised research staff in basic and applied research and development efforts concerned with analysis of teleoperator workload and improvement of controls and information and software display systems for teleoperator and teleautonomous systems. Responsibilities included formulation and construction of research and development proposals, pursuit of funding from DOD and other governmental agencies, management and conduct of experimental research, publication of research findings, and periodic consultations on ergonomic or human factors engineering design problems. Served as principal investigator on the following projects: Teleoperator Remote Presence Systems (TOPS); Master Controller, Tactile Display, Tactile Sensor, and Teleoperator Performance Test Battery Development

Senior Research Engineer (1980-1983)**James M. Miller Engineering, Ann Arbor, Michigan 48109**

Responsibilities included management and conduct of product and workplace design review, evaluation, and testing, as well as conduct of post-accident engineering forensic analyses with primary emphasis in product or workplace performance, health, and safety criteria. Typical activities included consultation with clients concerning product design or liability issues, preparing proposals, managing client accounts, designing and execution of product/workplace human factors/ergonomic analyses or accident reconstructions, and preparation of engineering reports or for depositions/testimony for clients.

Research Program Manager and Principal Scientist (1976-1979)**Office of Research and Development, U. S. Coast Guard, Washington, DC**

Served as a principal investigator and program manager tasked with developing, managing, and conducting experimental research in the area of industrial and human factors engineering. Research programs in boat and ship task analysis, vessel control station and display panel design, thermal protective clothing design and immersion hypothermia treatment, visual distress signal design, recreational boat safety, and development of design guidance for ship design, were principal areas of responsibility.

Military Experience**Commander, U.S. Coast Guard Reserve, Washington, DC (1976-2000)**

Served as Commanding, Executive, Readiness, Training, and Administrative Officers at Port Safety and Security, Vessel Augmentation, and Search and Rescue Units located in Toledo, OH, Honolulu, HI, Milwaukee, WI, Duluth, MN, or Detroit, MI. Responsible for all phases of the organization, management, and performance of the reserve unit. Directly supervising up to 11 officers and 70 enlisted personnel.

Professional Experience Indicators: Industrial Engineer, Search and Rescue, and Port Safety and Security.

**Navy Hospital Corpsmen attached to U.S. Marine Corps
(1971-1973 Active Duty; 1974-1976 Active Reserve Duty)**

Teaching Activity

Recent Teaching Activity at West Virginia University

Year	Term	Course Taught	Units	Type
2005	Fall	IENG 360 Human Factors Engineering	3	Undergraduate
		IENG 220 Reengineering	3	Undergraduate
	Spring	IENG 564 Industrial Ergonomics	3	Graduate
		IENG 668 Special Topics in Ergonomics	3	Graduate
	Summer	Doctoral & MS/MSE Graduate Student Research	1-3	Graduate
2004	Fall	IENG 360 Human Factors Engineering	3	Undergraduate
		IENG 564 Industrial Ergonomics	3	Graduate
	Spring	IMSE 564 Industrial Ergonomics	3	Graduate
		IMSE 660 Advanced Human Factors Engineering	3	Graduate
		Doctoral & MS/MSE Graduate Student Research	1-3	Graduate
	Summer	Occupational Medicine & Health	3	Graduate
2003	Fall	IMSE 668 Special Problems in Human Factors	3	Graduate
		IMSE 360 Human Factors Engineering	3	Undergrad
		Doctoral & MS/MSE Graduate Student Research	1-3	Graduate
	Spring	IMSE 360 Human Factors Engineering	3	Undergrad
		IMSE 660 Advanced Human Factors Engineering	3	Graduate
		Doctoral & MS/MSE Graduate Student Research	1-3	Graduate
	Summer	Doctoral & MS/MSE Graduate Student Research	1-3	Graduate

Classes Taught as Visiting Professor at West Virginia University

1. IMSE 360 Human Factors Engineering,
Dept. Industrial and Management Systems Engineering, West Virginia University
2. IMSE 564 Industrial Ergonomics, Dept. Industrial and Management Systems
Engineering, West Virginia University
3. IMSE 660 Advanced Human Factors Engineering, Dept. Industrial and Management
Systems Engineering, West Virginia University
4. IMSE 668 Special Problems in Human Factors Engineering,
Dept. Industrial and Management Systems Engineering, West Virginia University

Classes Taught as Associate Professor at University of Washington

1. INDE 541 Advanced Human Factors Engineering,
Industrial Engineering, University of Washington
2. ENHV 566 Introduction to Ergonomics,
Dept. of Environmental Health, University of Washington
3. ENVH 569 Occupational Biomechanics,
Dept. of Environmental Health, University of Washington
4. ENVH 562 Technical Aspects of Safety Engineering,
Dept. of Environmental Health, University of Washington
5. INDE 599 Independent Study in Ergonomics and Safety Engineering

6. Doctoral and Masters Thesis Research

Courses Developed and Taught as Assistant Professor

1. IE 549 Human Factors Engineering,
Department of Industrial Engineering, University of Wisconsin
2. IE 664 Advanced Ergonomics,
Department of Industrial Engineering, University of Wisconsin
3. IE 665 Advanced Ergonomics Laboratory,
Department of Industrial Engineering, University of Wisconsin
4. IE 859 Seminar: Human Factors Engineering (Telerobotics),
Department of Industrial Engineering, University of Wisconsin
5. IE 859 Seminar: Human Factors Engineering (Bioinstrumentation & Laboratory Safety),
Department of Industrial Engineering, University of Wisconsin
6. IE 859 Seminar: Human Factors Engineering (Perceptual-Motor Skill Theory),
Department of Industrial Engineering, University of Wisconsin
7. Independent Study in Ergonomics and Safety Engineering
8. Doctoral and Masters Thesis Research

Journal Clubs

1. Ergonomics & Safety Engineering

Current Graduate Students

Doctoral Students (Committee Chair)

1. Erik Sinsel

Doctoral Students (Committee Member)

2. Nancy Dorset

Masters Students (Committee Chair)

1. Joe McFerron
2. Amie King
3. John Ree
4. Lauren Wolbert
5. Meng Han

Masters Students (Committee Member)

1. Michelle Sudoff
2. Dan Russo, IH Student (Warren Myers, Chair)

Students Graduated

Doctoral Students (Committee Chair)

1. Tom McDowell, Ph.D., Occupational Safety and Health, Industrial & Management Systems Engineering, West Virginia University 2006.
2. Diana Schwerha, Ph.D., Industrial & Management Systems Engineering, West Virginia University 2004
3. Steven Arndt, Ph.D., Industrial Engineering, University of Wisconsin 1996
4. Seongil Lee, Ph.D., Industrial Engineering, University of Wisconsin 1994

Doctoral Students (Committee Member)

1. Edgar Vieira, Ph.D., Rehabilitation Medicine, University of Alberta, 2006
2. Weijia Zhou, Ph.D., Mechanical Engineering, University of Wisconsin 1994
3. Roger Smith, Ph.D. Industrial Engineering, University of Wisconsin 1994
4. Seoung Kwon Kim, Ph.D. Physical Education, University of Wisconsin 1993
5. Jon Gunderson, Ph.D. Industrial Engineering, University of Wisconsin 1991
6. Kurt A. Kaczmarek, Ph.D. Electrical Engineering, University of Wisconsin 1991
7. Naomi Swanson, Ph.D. Industrial Engineering, University of Wisconsin 1988

Masters Students (Committee Chair)

1. Ashok Dwarkanath, MSIE, Industrial & Management Systems Engineering, Industrial & Management Systems Engineering, 2006.
2. Viviana Baggio, MSIE, Industrial & Management Systems Engineering, Industrial & Management Systems Engineering, 2006.

3. Mun-Su Seol, MS Safety Management, Industrial & Management Systems Engineering, West Virginia University, 2005
4. Nicolas Salazar, MS Industrial Hygiene, Industrial & Management Systems Engineering, West Virginia University, 2004
5. Astrid Schreuder, MSIE Industrial Engineering, University of Washington 1997
6. Theresa Lango, MS Environmental Health, University of Washington 1997
7. Tommey Meyers, MS Environmental Health, University of Washington 1997
8. Jason Griffith, MSE Industrial Engineering, University of Washington 1996
9. Patrice Miner, MS Environmental Health, University of Washington 1995
10. Larry Shaw, MS Environmental Health, University of Washington 1994
11. Susan Fuerlinger, MSIE Industrial Engineering, University of Wisconsin 1993
12. An-Che Chen, MSIE Industrial Engineering, University of Wisconsin 1992
13. Tim Jones, MS Industrial Engineering, University of Wisconsin 1991
14. Mark Stultz, MS Industrial Engineering, University of Wisconsin 1991
15. Thomas Yen, MSIE Industrial Engineering, University of Wisconsin 1991
16. Steven Arndt, MS Industrial Engineering, University of Wisconsin 1991
17. Yueh-Chuan Kung, MSIE Industrial Engineering, University of Wisconsin 1990

Masters Students (Committee Member)

1. Dan Russo, MS Industrial Hygiene, Industrial & Management Systems Engineering, West Virginia University, Present
2. Jason Sanders, MS Environmental Health, University of Washington 1996
3. John Jerney, MSE Mechanical Engineering, University of Wisconsin 1993
4. Hwa-Ping Chang, MSE Mechanical Engineering, University of Wisconsin 1990

Continuing Education

Course Director & Instructor

1. Advances in Ergonomics, May 8, 1997, Northwest Center for Occupational health and Safety, Department of Environmental Health, School of Public Health and Community Medicine, University of Washington, Seattle, WA, 98195.
2. Office Ergonomics, January 27-28, 1994, Northwest Center for Occupational health and Safety, Department of Environmental Health, School of Public Health and Community Medicine, University of Washington, Seattle, WA, 98195.
3. Ergonomics for Managers, January 26, 1994, Northwest Center for Occupational health and Safety, Department of Environmental Health, School of Public Health and Community Medicine, University of Washington, Seattle, WA, 98195.
4. Ergonomics Workshop, 1991, Phelps Dodge Magnet Wire Corporation, Fort Wayne, IN.
5. Ergonomics Workshop, 1991, Association of American Railroads, Washington, DC.

Course Instructor

1. Occupational Health, Occupational Medicine, West Virginia University, June 21-22, 2004
2. Occupational Hazards to Health Care Workers, 1994, Northwest Center for Occupational Health and Safety, Seattle, WA.
3. Office Ergonomics, 1994, Execu-Tech Services and Boise-Cascade, Seattle, WA.
4. Human Factors Engineering Issues in Product Liability, 1991, Products Liability Course, School for Continuing Education, University of Wisconsin, Madison, WI.

Research Funding

Year	Project Title	Agency	Funding
2006-2007	NAVAIR SWARM Human Factors Interface Design	NAVIAR via Augusta Systems	50,000
2006-2007	Advanced Biomechanical and Cardiopulmonary Assessment Suit (ABACAS) Development Program	NIOSH (Funding to 2008) Annual Funding is Reported on a Year-by-Year Basis	\$235,463
2005-2006	Advanced Biomechanical and Cardiopulmonary Assessment Suit (ABACAS) Development Program	NIOSH	100,000
2005-2010	Safety Engineering and Ergonomics Training Program	NIOSH	250,000
2003-2005	Improvements in Plant Facilities Through Development of Work-Posture Prediction Models	Mail-Well Corporation, CO	100,000
1998-2002	Human Factors Engineering and Safety Research Support Contract	United States Coast Guard Research and Development Center, Groton, CT	1,200,000
1999-2000	Ergonomic Hazard Abatement Project	United States Navy	267,000
1996-1997	Lumber Grader Ergonomic Intervention Study (Principal Investigator)	Weyerhaeuser Corporation	75,000
1994-1999	Coast Guard Human Factors & Ergonomics Research Multi-Task Order Contract (Co-Principal Investigator)	United States Coast Guard Research and Development Center, Groton, CT	5,000,000
1995-1995	Telerobotic Performance Analysis System Test Battery (Principal Investigator)	NASA	30,000
1995-1996	Autostereovision Display Research	National Science Foundation SBIR Research Grant	40,000
1994-1997	Tactile Display Design for Computer Users Who Are Blind (Principal Investigator)	National Institutes for Disability & Rehabilitation Research, Washington, DC	76,000
1994-1995	Orthotic Lumbar Garment Analysis (Principal Investigator)	USA Support, Inc.	22,845
1993	Educational Resource Center Grant (Coinvestigator)	National Institutes for Disability & Rehabilitation Research, Washington, DC	3,500,000
1993	Human-Orientated Technologies & Telerobotic Performance, Wisconsin Center for Space Automation	NASA	412,000

Year	Project Title	Agency	Funding
	& Robotics (Co Principal Investigator)		
1993	Vibrotactile Display Development for Master-Controllers (Principal Investigator)	Orbitec Inc.	35,000
1993	Human-Orientated Technologies & Telerobotic Performance, Wisconsin Center for Space Automation & Robotics (Co Principal Investigator)	NASA	612,300
1992	Job Energy Management Model (Principal Investigator)	Association of American Railroads	40,000
1992	Human-Orientated Technologies & Telerobotic Performance, Wisconsin Center for Space Automation & Robotics (Co Principal Investigator)	NASA	505,000
1991	Human-Orientated Technologies & Telerobotic Performance, Wisconsin Center for Space Automation & Robotics (Co-Principal Investigator)	NASA	525,800
1991	Undergraduate Human Factors Teaching Laboratory Grant (Co-Principal Investigator)	State of Wisconsin	258,000
1989	Posture Prediction Model for Use in Computer-Aided Design Systems Incorporating Ergonomic Design (Principal Investigator)	WARF Grant	28,500
1989	Development of Ergonomic Design Guide (Principal Investigator)	Association of American Railroads	152,000
1989-1992	Risk of Low-Back Injury in Municipal Employees (Coinvestigator)	Centers for Disease Control	33,000
Total Funding			13,497,908

Other Approved Funding or Proposals

Year	Title	Agency	Funding
2005	Alpha Pi Mu	WVU	500
2004	Alpha Pi Mu	WVU	500
2003	Biosafety Laboratory Approval	WVU	0
2003	Alpha Pi Mu	WVU	1,000
Total Funding			2,000

Departmental, College and Professional Service Activities

Departmental University Activities at West Virginia University

1. Faculty Advisor, Alpha Pi Mu, 2003-2006
2. Graduate Committee Member, 2003-Present
3. Faculty Promotion and Tenure Committee, 2004-Present
4. Undergraduate Committee Member, 2003-2005
5. Undergraduate Committee Chair 2005-Present
6. Chair, Faculty Search Committee 2005-2006
7. Outside Funding 2003-Present
8. NASA WV Space Grant Undergraduate Research Project Advisor 2005-2006

College and University Activities at West Virginia University

1. Undergraduate Research Day Advisor 2005, 2006
2. Member, Advisor of Year 2004 Committee 2005
3. Library Committee Member, 2003-2005
4. Chair, CEMR Faculty Executive Committee, 2005-Present

University Affiliations and Activities at Previous Universities

1. Department, Admissions Committee Member 1993-1997
2. Member, Promotion and Tenure, 1993-1997
3. Development Committee, 1993-1997
4. Faculty Member, Manufacturing Systems Engineering Program, 1988-1993
5. Faculty Member, University of Wisconsin Institute on Aging & Adult Life, 1988-1993
6. Member, Undergraduate Committee, 1991 to 1993
7. Faculty Advisor, Alpha Pi Mu, 1988-1992
8. Faculty Senator, Department of Industrial Engineering 1990 to 1991
9. Alternate Faculty Senator, Department of Industrial Engineering 1989-90
10. Chair, Liaison Committee for Statistics, 1989 to 1991
11. Engineering Day Committee 1991-1993
12. College of Engineering's Committee on Ethics, Ethnicity, and Social Responsibility, 1989-90

Professional Service Activities

Editorial Boards

1. International Journal of Industrial Ergonomics 1993-2000
2. Journal of Virtual Reality 2005-Present

Reviewer

1. IEEE Journal of Engineering in Medicine and Biology
2. International Journal of Human-Computer Interaction
3. International Journal of Industrial Ergonomics
4. Journal of Ergonomics
5. Journal of the Human Factors and Ergonomics Society
6. Journal of Applied Ergonomics

Offices Held in Professional Societies

1. Technical Program Chair 2007, Aging, Human Factors and Ergonomics Society
2. General International Chair, Society of Automotive Engineering's 27 th International Conference on Environmental Systems, 1996-1997.
3. Vice-Chair, Society of Automotive Engineering's 26 th International Conference on Environmental Systems, 1995-1996.
4. Technical Chair, American Institutes of Aeronautics and Astronautics Society of Automotive Engineering's 25 th International Conference on Environmental Systems 1994-1995
5. Representative, Human Factors Society's Council of Technical Groups (Professional Educators) 1991-1993
6. Editor, Human Factors Society's Professional Educators' Newsletter 1991-1993
7. Chair, Awards Committee for International Industrial Ergonomics & Safety Foundation 1992-1993

International and National Committee Membership:

1. Committee E-34.0 Occupational Health and Safety, American Standards and Testing of Materials (ASTM)
2. Safety Requirements for Products, Equipment and Facilities, American Standards and Testing of Materials (ASTM) Subcommittee E-34.80
3. Life Sciences Technical Committee, American Institute of Aeronautics & Astronautics,
4. Human Factors Engineering Working Group, American Institute of Aeronautics & Astronautics
5. U.S. Coast Guard's Committee on Maritime Medicine

Chair, Symposia (1993 and Beyond)

1. Exploring Age Differences in Kinematics, Perception and Cognition. Annual Meeting of Human Factors and Ergonomics Society, Orlando, FL Sept. 30, 2005.
2. Preventing Musculoskeletal Injuries in Construction Industry, Northwest Construction Safety Conference, Seattle, WA, September 12-13, 1994.
3. Psychomotor Performance, Rehabilitation Ergonomics Conference, 12th Triennial Congress of the International Ergonomics Association, Toronto, Canada, August 15-19, 1994.
4. Telesciences & Telerobotics, Joint SAE & AIAA International Conferences on Environmental Life Support Systems, Friedrichshafen, Germany, June 21-25, 1994.
5. Crew Interface & Human Factors in Robotics Operations, AIAA Space Programs and Technologies Conference, Marshall Space Flight Center, Huntsville, AL, Sept 21-23, 1993.
6. Three-Dimensional Vision, Fifth International Conference on Human-Computer Interaction, Orlando, FL August 8-13th, 1993.

Public Lectures

1. 2002 "Costa Rica's Ecology and Technological Advancement," Red Hill High School, Chesapeake, Ohio
2. 1997 - Invited Speaker, "Seating Biomechanics." Oregon Governor's Occupational Safety & Health Conference, Portland, Oregon, March 3-5.
3. 1996 - Invited Speaker, "Future Office Design." Oregon OSHA Office Ergonomics Boot Camp.
4. 1994- Getting a grip on work. Puget Sound Chapter of Human Factors and Ergonomics Society.
5. 1992 - Minicourse on Telerobotics, Cherokee School, Public School System, Madison, WI
6. 1991- Invited Speaker, Annual Engineers Day, University of Wisconsin College of Engineering
7. 1991- Invited Speaker, Fall Day On Campus, University of Wisconsin Alumni Association
8. 1992-Participant & Speaker, Expanding Your Horizons in Science, Engineering and Mathematics, Society of Women Engineers
9. 1991-Participant & Speaker, Expanding Your Horizons in Science, Engineering and Mathematics, Society of Women Engineers
10. 1990-Participant & Speaker, Expanding Your Horizons in Science, Engineering and Mathematics, Society of Women Engineers
11. 1989-Participant & Speaker, Expanding Your Horizons in Science, Engineering and Mathematics, Society of Women Engineers
12. 1989-Key Speaker, Annual Bascom Hill Society Event

Advising and Supporting of Secondary School Educational Activities

1. 1989-Judge, National Science Teacher's Association, Destination Mars- High School NASA Science Competition
2. 1988-Advisor, Westinghouse Science Project Competition, Memorial High School

Pro Bono Consultations (Since 1994)

1. 2005, West Virginia State Journal, Ergonomics Series
2. 1994, MEDEX Program, University of Washington: Evaluation and modification of office work station.
3. 1994, Office of Personnel, University of Washington: Consultation on proposed keyboard and mouse designs.
4. 1994, Newspaper Pressmen, Seattle, Washington: Consultation on design of press roller and cleaning operations, and assessment of request for hoist equipment.
5. 1994, Hanford Environmental Health Foundation, Hanford, Washington: Ergonomics and Safety Program Review

Other Community Activities

President, Swim Team Booster Club, Sammamish High School, Bellevue, Washington (1994 to 1997)

Professional Licensure and Memberships

Professional Licensure

1. Certified Professional Ergonomist, License No. 97

Professional Membership

1. Aerospace Medical Association
2. American Institute of Aeronautics & Astronautics
3. American Society for Engineering Education
4. American Society of Biomechanics
5. American Society of Safety Engineers
6. Human Factors and Ergonomics Society
7. Illuminating Engineering Society of North America
8. Institute of Industrial Engineers, Senior Member
9. International Society of Biomechanics
10. International Industrial Ergonomics & Safety Foundation
11. New York Academy of Sciences
12. American College of Occupational Medicine
13. Reserve Officers Association

Science Advisory Board Member

1. Sevrain Tech, Inc. 1987-1990
2. Unified Technologies, Inc. 1990-1993

Consulting Experience

1. Anheuser-Busch Corporation
2. Association of American Railroads
3. Battelle Laboratories
4. Boeing Company
5. United Carpenters Union
6. Burlington Northern and Santa Fe Railroad
7. California Safety Associates, Inc.
8. Conrail Railroad
9. CSX Railroad
10. Educorp Software
11. Essex Corporation
12. ExecuTech Inc.
13. Firestone Tire and Rubber Company
14. Ford Motor Company
15. Foss Tugboats
16. Jet Propulsion Laboratory, California Institute of Technology
17. Injury Prevention Center, The Johns Hopkins University
18. Kansas City Southern Railroad
19. National Institutes of Safety and Health (NIOSH)
20. Nintendo Corporation
21. Norfolk Southern Railroad
22. Orbitec Inc.
23. OSHA, Federal
24. OSHA, Oregon
25. Owens/Corning Fiberglas
26. Pacific-Sierra Research Corporation
27. Phelps Dodge Magnet, Inc.
28. Santa Fe Railroad
29. Sevrain Tech, Inc.
30. Sony Corporation
31. Southern Pacific Railroad
32. Union Pacific Railroad
33. United Parcel Service
34. United States Coast Guard
35. United States Navy Department
36. United States Nuclear Defense Agency

37. Washington Post
38. Washington State, SHARP
39. Weyerhaeuser Corporation

Publications

Refereed Bound Communications

1. Zhou, W., Duffie, N.A. and Wiker, S.F. Adaptive control of remote grasp force in teleoperation. Submitted.
2. Zhou, W., Duffie, N.A. and Wiker, S.F. Impact of grasp posture, force and fatigue upon human-controlled force-reflective master-controller model dynamics. Submitted.
3. Wiker, S. F., Sinsel, E. and McFerron, J. Classification of kinematic time histories of discrete manual assembly reach and move therbligs using multiple discriminant analysis of trajectory path and linear velocity and acceleration behaviors. **Proceedings of 11th International Conference on Human Aspects of Advanced Manufacturing Agility and Hybrid Automation**, Poznan, Poland, 9th-12th July, 2007.
4. Wiker, S. F., Sinsel, E., McFerron, J., Jackson, M., Westfall, B., Maduri, A. Use of back-propagation genetic algorithms for parsing and classification of continuous wholebody kinematic posture time histories into analytically useful subtasks. **Proceedings of 11th International Conference on Human Aspects of Advanced Manufacturing Agility and Hybrid Automation**, Poznan, Poland, 9th-12th July, 2007.
5. Wiker, S. F., Sinsel, E. and McFerron, J. Prediction of hand forces and moments using neural net modeling of ground reaction forces and kinematic data. **Proceedings of International Society of Biomechanics**. Taipei, Taiwan (submitted)
6. Wiker, S. F., Maduri, A., Jackson, M., Westfall, B., McFerron, J and Sinsel, E. Interaction of industrial task kinematics and optical retro-reflective marker cluster spacing: An analysis of marker detection accuracy and cost of data reduction. **Proceedings of the International Society of Optical Engineering**, Boston, MA (submitted)
7. Wiker, S. F., Jackson, M., Westfall, B., Maduri, A., McFerron, J and Sinsel, E. Development and validation of a testbed for rapid prototyping and evaluation of Automated Biomechanical and Cardiopulmonary Sensor Suite (ABACAS) Systems. **Proceedings of the International Society of Optical Engineering**, Boston, MA (submitted)
8. Wiker, S. F., Schwerha, D. J. and Jaraiedi, M. Auditory and visual distractor decrement in older worker manual assembly task learning: Impact of spatial reasoning, field independence and level of education. **Intl J of Human Factors & Ergonomics in Manufacturing**. Submitted.
9. Schwerha, D. J., Wiker, S.F. and Jaraiedi, M. Aging and distraction resistance during psychomotor task learning. **Intl J Industrial Ergonomics**. (in press)
10. Wiker, S. F. and Baggio, V. Pre-Exertion perceptions of musculoskeletal overexertion injury risk: An assessment of age, gender, anthropometric, and lifting task factors. **Proceedings Human Factors & Ergonomics Society**, Baltimore, MD (Accepted)
11. McDowell, T. W., Wiker, S. F., Dong, R. G. and Welcome, D. E. Effects of vibration on grip and push force-recall accuracy. **(In Press) Intl J Industrial Ergonomics**.
12. McDowell, T. W., Wiker, S. F., Dong, R. G., Welcome, D. E. and Schopper, A. W. (2006) Evaluation of psychometric estimates of vibratory hand-tool grip and push forces. **Proceedings of the First American Conference on Human Vibration**. Morgantown, WV, 10-12 June.

13. Wiker, S. F., Schwerha, D. J. and Jaraiedi, M. (2006) Impact of auditory and visual distractors upon manual assembly task: learning among older workers with different levels of spatial reasoning and field dependence. **Proceedings of the 50th Annual Human Factors and Ergonomics Society Conference**. San Francisco, California, October 16-20, pp 200-204.
14. Schwerha, D. J., Wiker, S. F. and Jaraiedi, M. (2006) Impact of age and distractors upon learning a manual assembly task. **Proceedings of the International Ergonomics Association**. 10-15 July, Maastricht, Netherlands.
15. McDowell, T. W., Wiker, S. F., Dong, R. G., Welcome, D. E. and Schopper, A. W. (2006) Evaluation of psychometric estimates of vibratory hand-tool grip and push forces. **Intl J Industrial Ergonomics** 36(2):119-128.
16. Wiker, S. F. (2005) Ergonomic risks, interventions and economic gains. **Proceedings of the Eighth Conference and Exhibition on Occupational Safety and Health**. 28-29 June, Kuala Lumpur, Malaysia.
17. Wiker, S. F. (2005) Impact of design features upon perceived tool usability and safety. **Proceedings of International Society for Optical Engineering: Intelligent Systems in Design and Manufacturing VI** 5999(OE05-SA108-29):R1-R14.
18. Wiker, S. F. (2005) Challenges facing developers of CAD/CAM models that seek to predict human working postures. **Proceedings of International Society for Optical Engineering: Intelligent Systems in Design and Manufacturing VI** 5999(OE05-SA108-28):Q1-Q7.
19. Wiker, S. F. (2003) Statistical challenges facing development of epidemiologically-validated low-back injury risk predictive and descriptive models using biomechanical, anthropometric or consensus-based ergonomic risk prevention guidelines. **Seminars in Spine Surgery** 15(1): 3-15.
20. Myers, A., Baker, S. P., Li, G., Smith, G., Wiker, S.F., Liang, K. and Johnson, J. (1999) Back injury in municipal workers: A case-control study. **Am J Public Health** 89(7): 1036-1041.
21. Spielholz, P., Wiker, S. F. and Silverstein, B. (1998) An ergonomic characterization of work in concrete form construction. **Journal American Industrial Hygiene Assoc** 59(9): 629-635.
22. Spielholz, P. and Wiker S.F. (1996), Communicating ergonomic hazards in the face of outrage. **Advances in Industrial Ergonomics and Safety** (8): 758-762.
23. Wiker, S. F., Stewart, K., Meyers, T. and Spielholz, P. (1996) Printed Circuit Board Visual Inspection Performance: A Comparative Analysis of Mono- and Stereovision Macroscopic Views. **Society of Photo-Optical Instrumentation Engineers**. Paper No. 3012-07.
24. Wiker, S. F., Baker, D. R., Arndt, S. R. and Zhou, W. (1996) Impact of Varying Levels of Autostereovision Upon Telem Manipulation. **Proceedings of the Human Factors and Ergonomics Society 40th Annual Meeting**, Philadelphia, PA, Taylor and Francis, pp. 688-692.
25. Spielholz P and Wiker SF, (1996) Reports of Regional Body Discomfort During Carpenter Apprentice Training. **Proceedings of the Human Factors and Ergonomics Society 40th Annual Meeting**, Philadelphia, PA, Taylor and Francis, pp. 688-692.
26. Spielholz, P. and Wiker, S.F. (1995), Assessing Ergonomic Hazards in Unstructured Work Using Work Sampling Techniques: An Application in the Construction of Concrete Formwork, **Advances in Industrial Ergonomics and Safety** (7): 75-80.
27. Zhou, W., Duffie, N. and Wiker, S. F. (1994) Control of grasping force in teleoperation using model reference adaptive approach. **American Institutes of Aeronautics & Astronautics**. 94(1440):1-7.

28. Wiker, S.F. and Chen, A. (1994) Accuracy and efficacy of using pictograms for self-report of postures assumed when performing lifting tasks. **Advances in Industrial Ergonomics and Safety** 4: 641-644.
29. Wiker, S. F. and Fuerlinger, S. (1994) Impact of cyclic pinch-grasp force, duration and frequency upon perceived grasp force and localized discomfort in the hand and arm. **Advances in Industrial Ergonomics and Safety**. 4: 569-572.
30. Wiker, S. F. (1993) Human factors in space automation and robotics. **Aerospace America** 31(10): 30-35.
31. Wiker, S. F. (1993) Telerobotic performance analysis system: An analysis of reach, move, and position elements. **American Institutes of Aeronautics & Astronautics**
32. Zhou, W., Duffie, N. and Wiker, S. F. (1993) Identification of human grasp dynamics in teleoperation. **American Institutes of Aeronautics & Astronautics**. 93(4112):1-10.
33. Wiker, S. F. (1993) Telemanipulation: Master-controller design issues. **Advances in Human Factors & Ergonomics** 19(A): 173-178.
34. Lee, S., Wiker, S. F. and G.C. Vanderheiden (1993) Interactive haptic interface: Two-dimensional form perception for blind access to computers. **Advances in Human Factors & Ergonomics** 19(B): 190-195.
35. Wiker, S. F. (1993) Teaching ergonomic theory and practice using computer models. In Knadler, Jr., C. and Vakilzadian, H. (Eds.) **International Conference on Simulation in Engineering**. 25(3): 71-75.
36. Wiker, S. F. and Duffie, N.A. (1992) Grasp force control in telemanipulation. **American Institutes of Aeronautics & Astronautics** 92(1453): 1-12.
37. Wiker, S. F. and Stultz, M. (1992) NIOSH Work Practices Guide for Manual Lifting: Posturally-based differences in perceived stress in lifting tasks of equivalent design merit. In Kumar, S. (Ed.) **Advances in Industrial Ergonomics & Safety**. Washington, DC: Taylor & Francis, p. 607-614.
38. Wiker, S. F., Jones, T., Baker, S., Myers, A., Smith, G. and Edwards, C. (1992) Measurement of indices of ergonomic stress in an epidemiological study of low-back injuries in municipal workers. In Kumar, S. (Ed.) **Advances in Industrial Ergonomics & Safety**. Washington, DC: Taylor & Francis, p. 913-920.
39. Baker, S. P., Jones, T. M., Myers, A. H., Wiker, S. F., Smith, G., Corn, M., Sznajder, J. (1992) Prevention of low-back injuries in municipal workers. In Kumar, S. (Ed.) **Advances in Industrial Ergonomics & Safety**. Washington, DC: Taylor & Francis, p. 921-924.
40. Wiker, S. F. and Lee, S. (1992) Control and gauging grasp force in telemanipulators: A comparison of direct force and electrocutaneous display systems. In Kumar, S. (Ed.) **Advances in Industrial Ergonomics & Safety**. Washington, DC: Taylor & Francis, p. 1243-1251.
41. Wiker, S. F. (1992) Posturally-mediated perceptions of strain encountered when lifting: A preliminary analysis of the basis and value in predicting worker posture. **Computer Applications in Ergonomics, Occupational Safety and Health**. Amsterdam: North-Holland, p. 497-509.
42. Lee, S, Wiker, SF and Vanderheiden, G.(1993) Interactive haptic interface: two-dimensional form perception for blind access to computers. **Proceedings of the Fifth International Conference on Human-Computer Interaction**, Vol 2., pp 190-5.
43. Wiker, SF. (1992) Posturally-mediated perceptions of strain encountered when lifting. A preliminary analysis of the basis and value in predicting worker posture. **Proceedings of the International Conference on Computer Aided Ergonomics and Safety, Computer Applications in Ergonomics**, pp. 497.

44. Wiker, S. F. (1991) Fatigue, discomfort, and changes in the psychometric function found with repetitive pinch grasps. **Designing for Everyone: Proceedings of the 11 th Congress of the International Ergonomics Association**, Paris. New York: Taylor & Francis, p. 368-370.
45. Wiker, S. F. (1991) Review of Haslegrave, Wilson, Corlett and Manenica (Eds) Work Design in Practice. **IEEE J Engineering in Medicine and Biology** Dec. p. 68.
46. Wiker, S. F., Vanderheiden, G., Lee, S. and Arndt, S. (1991) Development of tactile mice for blind access to computers: Importance of stimulation locus, object size, and vibrotactile display resolution. **Proceedings of the Human Factors Society 35 th Annual Meeting**, p. 708-712.
47. Wiker, S. F. and Duffie, N. A. (1990) Telerobotic Performance Analysis System (TPAS). **Proceedings of the Annual Space Operations Automation and Robotics Conference**, Albuquerque, NM, June 26-28 th.
48. Wiker, S. F., Duffie, N. A., Yen, T., Gayle, K. (1990) Comparison of Force and Tactile Feedback for Telemanipulation Grasp Force Control. **Proceedings of the Annual Space Operations Automation and Robotics Conference**, Albuquerque, NM, June 26-28 th.
49. Duffie, N.A., Wiker, S. F., Zik, J. and Gayle, K. (1990) Impact of Inertia, Friction and Backlash Upon Control of Grasp Force in Telemanipulation **Proceedings of the Annual Space Operations Automation and Robotics Conference**, Albuquerque, NM, June 26-28 th.
50. Wiker, S. F., Chaffin, D. B., and Langolf, G.D. (1990) Shoulder postural fatigue and discomfort: No relationship with isometric strength capability in a light-weight manual assembly task. **Intl J Industrial Ergonomics**. 5: 133-146.
51. Wiker, S. F. (1990) Review of Ivergard, T. (1989) Handbook of Control Room Design and Ergonomics. **IEEE J Engineering in Medicine and Biology** Dec.
52. Wiker, S. F., Langolf, G. D., and Chaffin, D. B. (1989) Arm posture and human movement capability. **Human Factors** 31(4): 421-442.
53. Wiker, S. F., Chaffin, D. B., and Langolf, G. D. (1989) Shoulder posture and localized muscle fatigue and discomfort. **Ergonomics** 32(20):211-237.
54. Wiker, S. F. and Chaffin, D.B. (1989) Electromyography: An insensitive technique for characterization of postural fatigue in the shoulder complex. in Mital, A. (Ed.) **Advances in Industrial Ergonomics and Safety I**. London: Taylor & Francis.
55. Duffie, N.A., Wiker, S. F. and Zik, J. J. (1989) Test bed experiments for various telerobotic system characteristics and configurations. **Proceedings of the Annual Space Operations Automation and Robotics Conference**, Houston, TX, July 25-27 th.
56. Wiker, S. F., Hershkowitz, E., and Zik, J. (1989) Teleoperator comfort and psychometric stability: Criteria for limiting master-controller forces of operation and feedback during telemanipulation. **Proceedings of the National Aeronautics & Space Administration's Conference on Space Telerobotics**, Jet Propulsion Laboratory, California Institute of Technology, Pasadena, CA.
57. Moore, D. K., Spain, H., Uttal, W. R., Wiker, S. F. and Yamamoto, S. (1987) Advanced telerobotic systems under development in Japan. **Scientific Bulletin** 12(3): 61-70.
58. Pepper, R.L., Kennedy, R.S., Bittner, Jr., A.C., Wiker, S.F., and Harbeson, M.M. (1985) Performance evaluation tests for environmental research (PETER): Code substitution test. **Perceptual Motor Skills** 61: 735-745.

59. Langolf, G. D., Chaffin, D. B., Wiker, S. F., Anderson, C. K., and Evans, S. M. (1984) Ergonomic problems and improvements in automobile assembly operations. **SAE Technical Paper** No. 840038.
60. Wiker, S. F. and Miller, J. M. (1983) Acceleration exposures in forward seating areas of bowrider recreational boats. **Human Factors** 25(3): 319-327.
61. Wiker, S. F., Kennedy, R. S. and Pepper, R. L. (1983) Performance evaluation tests for environmental research (PETER): Navigation plotting task. **Aviat Space Environ Med** 54(2): 144-149.
62. Wiker, S. F., Pepper, R. L. and McCauley, M. E. (1981) A vessel class comparison of physiological, affective state, and psychomotor performance changes in men at sea. **Proceedings of the International Workshop on Research Methods in Human Motion and Vibration Studies**, New Orleans, LA, Sep .
63. Pepper, R. L., Kennedy, R. S., Bittner Jr., A. C. and Wiker, S. F. (1980) Performance evaluation tests for environmental research (PETER): Code substitution test. **Proceedings of the 7 th Psychology in the Department of Defense Symposium**, U. S. Air Force Academy.
64. Wiker, S. F. Kennedy, R. S. , McCauley, M. E., and Pepper, R. L. (1979) Susceptibility to seasickness: Influence of hull design and steaming direction. **Aviat Space Environ Med** 50(10): 1046-51.
65. Pepper, R. L. and Wiker, S. F. (1979) Repeated assessment of stress, mood, and performance changes resulting from exposure to vessel motions at sea. **Proceedings of the 23 rd Annual Meeting of the Human Factors Society**, Boston, MA.
66. Wiker, S. F., Kennedy, R. S., McCauley, M. E. and Pepper, R. L. (1979) Reliability, validity, and application of an improved scale for assessment of motion sickness severity. **Proceedings of the Annual Meeting of the Aerospace Medical Society**, Washington, DC.
67. Wiker, S. F. (1977) Perspectives in collision stressor research. **Boating Safety** Fall: 1-6.

Books and Book Chapters

68. Wiker, S. F. (working) **Ezra**.
69. Wiker, S. F. Importance of Human Factors Engineering in Promotion of Safety, in Haight, J. (Ed.) **Safety Professional's Handbook**. Accepted.
70. Wiker, S. F., Page, G. and McMahan, P.B. (1993) Ergonomic seating design. In Hansen, D. (Ed) **The Work Environment**. New York: Lewis Press, Inc, Vol. 3: 173-192.
71. Wiker, S. F. (1988) Tactile sensing techniques for robots. In E. Heer and H. Lum (Eds.) **Machine Intelligence and Autonomy for Aerospace Systems**. Washington, DC: American Institute of Aeronautics & Astronautics Press.

Theses and Dissertations

72. Wiker, S. F. (1986) Effects of relative hand location upon movement capability and fatigue. Dissertation, University of Michigan, Ann Arbor. Chaired by: D. B. Chaffin & G. D. Langolf.
73. Wiker, S. F. (1981) Motion sickness and associated physiological response to ship motion. Masters Thesis, George Washington University Washington, DC. Chaired by: R. K. Packer.

Technical Reports

74. Wiker, S. F., Salazar, N. and Baggio, V. (2004) Ergonomic Assessment of Printing Facility Jobs. Technical Report No. WVU-EL 1-2004., Ergonomics Laboratory, West Virginia University.
75. Wiker, S. F., Stewart, K., Meyers, T. and Spielholz, P. (1996) Printed Circuit Board Visual Inspection Performance: A Comparative Analysis of Mono- and Stereovision Macroscopic Views. Technical Report No. 7-29-96, Ergonomics Laboratory University of Washington, Seattle, WA.
76. Wiker, S. F. and Stewart, K. J. (1996) Comparative Ergonomic Measurement and Evaluation of United Parcel Service Facilities. Technical Report No. 7-5-96, Ergonomic Design Institute, Bellevue, WA.
77. Wiker, S. F., Stewart, K.J., Meyers, T. and Miner, P. (1996) Comparative Analysis of Crew Fatigue Response Aboard 44' and 47' Coast Guard Motor Life Boats. Technical Report No. 4-30-96, Ergonomics Laboratory, University of Washington, Seattle, WA.
78. Wiker, S. F., Baker, D. R., Arndt, S. R. and Zhou, W. (1996) Impact of Varying Levels of Autostereovision Upon Telem Manipulation. Ergonomics Laboratory Technical Report, University of Washington, No. 2-1.
79. Bramwell, A.T., Bittner, Jr., A.C., Kinghorn, R. A. and Wiker, S. F. (1993) 82' WPB Capability replacement human factors engineering recommendations: Executive summary. U. S. Coast Guard Technical Report.
80. Bittner, A. C., Jr., Wiker, S. F., Kinghorn, R. A. and Bramwell, A. T. (1993) 82' WPB Capability replacement human factors engineering recommendations: Integrated literature review and baseline design evaluation. U. S. Coast Guard Technical Report.
81. Bittner, A. C., Jr., Wiker, S. F., Kinghorn, R. A. and Bramwell, A. T. (1993) Crew-based recommendations for improved Coast Guard patrol boat design. U. S. Coast Guard Technical Report.
82. Wiker, S. F. (1988) Teletouch display development. Naval Ocean Systems Center Technical Report No. 1230, San Diego, CA.
83. Wiker, S. F. (1988) Tactile sensing capabilities for telerobotics. Naval Ocean Systems Center, Technical Report No. 1249.
84. Wiker, S. F. and Chaffin, D. B. (1984) An ergonomic analysis of selected jobs at an Owens/Corning Fiberglass plant. Technical Report submitted to Owens/Corning Fiberglass, Toledo, OH.
85. Chaffin, D. B., Wiker, S. F., and Anderson, C. K. (1984) A User's Guide to the Human Static Strength Prediction Program: Microcomputer Version. Center for Ergonomics Technical Report, March.
86. McCauley, M.E., Hennessy, R. T., and Wiker, S. F. (1984) United States Coast Guard Search and Rescue Crew-Small Boat Systems Performance Measurement Analysis. Human Factors Sciences, Inc. Technical Report No. 1, Carmel, California, August.
87. Wiker, S. F. (1983) Relationships between empirical and estimated human performance decrements during motion and radiation sickness. Technical Report submitted to Pacific-Sierra Research Corporation, Arlington, VA, Sep.
88. Miller, J. M. and Wiker, S. F. (1981) Truck driver fatigue: A review of the literature. J.M. Miller Engineering Technical Report, June.

89. Kennedy, R. S., Bittner Jr., A. C., Carter, R. C., Krause, M., Harbeson, M. M., McCafferty, D. B., Pepper, R. L., and Wiker, S. F. (1981) Performance evaluation tests for environment research (PETER): A collection of papers. Naval Biodynamics Laboratory Technical Report No. 80-R-008, July.
90. Wiker, S. F. and Pepper, R. L. (1981) Adaptation of crew performance, stress and mood aboard a SWATH and monohull vessel. U. S. Coast Guard Technical Report No. CG-D-18-81.
91. Wiker, S. F., Pepper, R. L., and McCauley, M. E. (1980) A vessel class comparison of physiological, affective state, and psychomotor performance changes in men at sea. U. S. Coast Guard Technical Report No. CG-D-07-81.
92. Wiker, S. F., Kennedy, R. S., McCauley, M. E., and Pepper, R. L. (1979) Reliability, validity, and application of an improved scale for assessment of motion sickness severity. U. S. Coast Guard Technical Report No. CG-D-29-79.
93. Wiker, S. F. and Pepper, R. L. (1978) Change in crew performance, physiology, and affective state due to motions aboard a small monohull vessel: A preliminary study. U. S. Coast Guard Technical Report No. CG-D-85-78.

Presentations

Conference or Invited Presentations

1. Wiker, S. F., Sinsel, E. and McFerron, J. (2007) Classification of kinematic time histories of discrete manual assembly reach and move therbligs using multiple discriminant analysis of trajectory path and linear velocity and acceleration behaviors. Eleventh International Conference on Human Aspects of Advanced Manufacturing Agility and Hybrid Automation, Poznan, Poland, 9th-12th July.
2. Wiker, S. F., Sinsel, E., McFerron, J., Jackson, M., Westfall, B., Maduri, A. (2007) Use of back-propagation genetic algorithms for parsing and classification of continuous wholebody kinematic posture time histories into analytically useful subtasks. Eleventh International Conference on Human Aspects of Advanced Manufacturing Agility and Hybrid Automation, Poznan, Poland, 9th-12th July.
3. Wiker, S. F., Sinsel, E. and McFerron, J. (2007) Prediction of hand forces and moments using neural net modeling of ground reaction forces and kinematic data. Annual Meeting of International Society of Biomechanics. Taipei, Taiwan, July 1-5.
4. Wiker, S. F., Maduri, A., Jackson, M., Westfall, B., McFerron, J. and Sinsel, E. (2007) Interaction of industrial task kinematics and optical retro-reflective marker cluster spacing: An analysis of marker detection accuracy and cost of data reduction. Annual Meeting of International Society of Optical Engineering—Optics East, Boston, MA, Sept 9-11.
5. Wiker, S. F., Jackson, M., Westfall, B., Maduri, A., McFerron, J. and Sinsel, E. (2007) Development and validation of a testbed for rapid prototyping and evaluation of Automated Biomechanical and Cardiopulmonary Sensor Suite (ABACAS) Systems. Annual Meeting of International Society of Optical Engineering—Optics East, Boston, MA Sept 9-11.
6. Wiker, S. F., Schwerha, D. J. and Jaraiedi, M. (2006) Impact of auditory and visual distractors upon manual assembly task: learning among older workers with different levels of spatial reasoning and field dependence. The 50th Annual Meeting of the Human Factors and Ergonomics Society. San Francisco, California, October 16-20, 2006.
7. Schwerha, D. J., Wiker, S. F. and Jaraiedi, M. (2006) Impact of age and distractors upon learning a manual assembly task. International Ergonomics Association Conference. 10-15 July 2006, Maastricht, Netherlands.
8. McDowell, T. W., Wiker, S. F., Dong, R. G., Welcome, D. E. and Schopper, A. W. (2006) Evaluation of psychometric estimates of vibratory hand-tool grip and push forces. Proceedings of the First American Conference on Human Vibration. Morgantown, WV, 10-12 June.
9. Wiker, S. F. (2005) Ergonomic risks, interventions and economic gains. Eighth Conference and Exhibition on Occupational Safety and Health, Putra World Trade Center, Kuala Lumpur, Malaysia, 28-29 June.
10. Wiker, S. F. (2005) Impact of design features upon perceived tool usability and safety. Intelligent Systems in Design and Manufacturing VI, International Society for Optical Engineering, Boston, MA, October 23-26
11. Wiker, S. F. (2005) Challenges facing developers of CAD/CAM models that seek to predict human working postures. Intelligent Systems in Design and Manufacturing VI, International Society for Optical Engineering, Boston, MA, October 23-26.

12. Wiker, S. F. (2004) Reduction of musculoskeletal discomfort and mental fatigue in lumber graders: Comparative efficacy of distributed breaks and job rotation. Presented at Occupational Safety and Health Administration's National Advisory Council on Ergonomics, January 27-28, Washington, DC
13. Wiker, S. F. (2003) Manual materials handling injuries and impact upon posture prediction. Grand Rounds, Occupational Medicine, West Virginia University, May 15th.
14. Wiker, S. F. and Thompson, J. (1999) Reduction of musculoskeletal discomfort and mental fatigue in lumber graders. Pacific Northwest Occupational and Environmental Medicine Annual Conference, Timberline, OR.
15. Wiker, S. F. (1999) Aging and manual materials handling tasks. National Ergonomics Conference and Exposition. December 6-10, Anaheim, California.
16. Wiker, S. F. (1997) Successful application of biomechanical models in the design of products and workplaces. SAE Aerospace Manufacturing Technology Conference and Exposition. June 2-5, Seattle, Washington.
17. Griffith, J. T. and Wiker, S. F. (1997) Workstation design and risk of back injury during various load-handling scenarios: A study of patient handling. SAE Aerospace Manufacturing Technology Conference and Exposition. June 2-5, Seattle, Washington.
18. Wiker, S. F. (1997) The relationship between portable hand-held grinders and risk of carpal tunnel syndrome. SAE Aerospace Manufacturing Technology Conference and Exposition. June 2-5, Seattle, Washington.
19. Wiker, S. F. (1994) Ergonomic guidelines for prevention of back injuries—fact and fiction. Northwest Occupational Health Conference, Bellevue, Washington, USA, October 14.
20. Wiker, S. F. (1994) Preventing musculoskeletal injuries in the construction industry. Northwest Construction Safety Conference, Tacoma, Washington, USA, September 12th.
21. Wiker, S. F. and Arndt, S. R. (1994) Validation and analysis of TPAS: A psychomotor test-battery proposed for evaluating and gauging disability in the upper extremities. Rehabilitation Ergonomics Conference, 12th Triennial Congress of the International Ergonomics Association, Toronto, Canada, August 15-19.
22. Wiker, S. F. and Vanderheiden, G. (1994) Analysis of haptic display design characteristics and their impact upon perception of graphical imagery and semantic information. Rehabilitation Ergonomics Conference, 12th Triennial Congress of the International Ergonomics Association, Toronto, Canada, August 15-19.
23. Wiker, S. F. and Chen, A. (1994) Analysis of required lift geometry, load, and initial stance upon prediction of semi-freestyle lifting postures. Computer-Aided Engineering and Safety Conference, 12th Triennial Congress of the International Ergonomics Association, Toronto, Canada, August 15-19.
24. Zhou, W., Duffie, N.A., and Wiker, S. F. (1994) Control of grasping force in teleoperation using model reference adaptive approach. Society of Automotive Engineers and American Institute of Aeronautics and Astronautics International Conference on Environmental Systems Conference, Friedrichshafen, Germany, June 21-24.
25. Wiker, S.F. and Chen, A. (1994) Accuracy and efficacy of using pictograms for self-report of postures assumed when performing lifting tasks. Annual International Industrial Ergonomics and Safety Conference, June 7-10, San Antonio, Texas.
26. Wiker, S. F. and Fuerlinger, S. (1994) Impact of cyclic pinch grasp force, duration and frequency upon perceived grasp force and localized discomfort in the hand and arm. Annual International Industrial Ergonomics and Safety Conference, June 7-10, San Antonio, Texas.

27. Zhou, W., Duffie, N.A., and Wiker, S. F. (1993) Identification of human grasp dynamics in teleoperation. Presented at the Annual Space Programs and Technologies Conference, Huntsville, AL, Sep 22.
28. Wiker, S. F., Duffie, N.A., Arndt, S. and Murray, S. (1993) Applications of the Telerobotic Performance Analysis System (TPAS). Presented at the Annual Space Programs and Technologies Conference, Huntsville, AL, Sep 22.
29. Lee, S., Wiker, S. F. and G.C. Vanderheiden (1993) Interactive haptic interface: Two-dimensional form perception for blind access to computers. Presented at the Human Computer Interface Conference, Orlando, Florida, August 9-13th.
30. Wiker, S. F. (1993) Telemanipulation: Master-controller design issues. Presented at the Human Computer Interface Conference, Orlando, Florida, August 9-13th.
31. Wiker, S. F. (1993) Teaching ergonomic theory and practice using computer models. Presented at the International Conference on Simulation in Engineering Education, La Jolla, CA, January 17-20.
32. Wiker, S. F., Vanderheiden, G. and Lee, S. (1992) Development of tactile displays for blind access to computers: Importance of blindness, display locus, size, and resolution upon haptic exploration of two-dimensional graphic images. Annual Meeting of the Human Factors and Ergonomics Society, October 5-10, Atlanta, Georgia.
33. Wiker, S. F. and Stultz, M. (1992) NIOSH Work Practices Guide for Manual Lifting: Posturally-based differences in perceived stress in lifting tasks of equivalent design merit. Presented at the Annual International Industrial Ergonomics and Safety Conference, June 10-14, Denver, Colorado.
34. Wiker, S. F. and Lee, S. (1992) Control and gauging grasp force in telemanipulators: A comparison of direct force and electrocutaneous display systems. Presented at the Annual International Industrial Ergonomics and Safety Conference, June 10-14, Denver, Colorado.
35. Wiker, S. F., Jones, T., Baker, S., Myers, A., Smith, G. and Edwards, C. (1992) Measurement of indices of ergonomic stress in an epidemiological study of municipal workers. Presented at the Annual International Industrial Ergonomics and Safety Conference, June 10-14, Denver, Colorado.
36. Smith, G. S., Myers, A. H., Baker, S. P., Li, G. Edwards, C. A., Liang, K. Y., Johnson, J. V. and Wiker, S. F. (1992) Health-related risk factors for back injuries and their medical consequences. Presented at the Annual International Industrial Ergonomics and Safety Conference, June 10-14, Denver, Colorado.
37. Myers, A. H., Baker, S. P., Wiker, S. F., Liang, K. Y., Li, G. Smith, G. S. Johnson, J. V. and Edwards, C. A. (1992) Factors related to low-back injuries in municipal workers. Presented at the Annual International Industrial Ergonomics and Safety Conference, June 10-14, Denver, Colorado.
38. Baker, S. P., Jones, T. M., Myers, A. H., Wiker, S. F., Smith, G., Corn, M., Sznajder, J. (1992) Prevention of back injuries in municipal workers. Presented at the Annual International Industrial Ergonomics and Safety Conference, June 10-14, Denver, Colorado.
39. Wiker, S. F. (1992) Developing multivector autoregressive models to plan and evaluate work schedules in hot environments. Presented at the First Annual IIE Research Conference, Chicago, IL, May 20-21
40. Wiker, S. F. (1992) Posturally-mediated perceptions of strain encountered when lifting: A preliminary analysis of the basis and value in predicting worker posture. Presented at the Computer Aided Ergonomics and Safety Conference, Tampere, Finland, May 18-20 th.

41. Wiker, S. F. (1992) Grasp force control in telemanipulation. Presented at the American Institutes of Aeronautics & Astronautics Space Programs and Technologies Conference, Huntsville, Alabama, March 25 th, 1992.
42. Wiker, S. F. (1990) Telerobotic Design Issues. Invited Presentation at the Annual Meeting of the Industrial Engineering Society, San Francisco, CA, May 20-23 rd.
43. Wiker, S. F., Kennedy, R. S. and Pepper, R. L. (1981) Performance evaluation tests for environmental research (PETER): Navigation plotting task. Presented at 52 nd Annual Scientific Meeting of the Aerospace Medical Association, San Antonio, TX 4-7 May.
44. Pepper, R. L., Kennedy, R. S., Bittner Jr., A. C. and Wiker, S. F. (1980) Performance evaluation tests for environmental research (PETER): Code substitution test. Seventh Psychology in the Department of Defense Symposium, U. S. Air Force Academy, 16-18 April.
45. Pepper, R. L. and Wiker, S. F. (1979) Repeated assessment of stress, mood and performance changes resulting from exposure to vessel motions at sea. Presented at Annual Human Factors Society, Boston, MA, October.
46. Wiker, S.F. and Pepper, R.L. (1978) Change in crew performance, physiology and affective state due to motions aboard a small monohull vessel: A preliminary study. Presented at the Society of Naval Architects and Marine Engineers, Honolulu, HI, 4 October.